

# 6 Finding the Nerve



**Y**ou probably found that some parts of your arm were more sensitive than others. In this reading you will learn about some of the reasons for these differences.

## CHALLENGE

**Why do different parts of your body have different sensitivities to touch?**

## READING

You use your senses, to gather information about your environment. Your senses include sight, hearing, taste, smell, and touch. To understand how you feel objects you touch, you need to know a little about your nervous system. Your **nervous system** includes your brain, your spinal cord, and your nerves. Figure 1 shows how these parts of your nervous system are connected. Nerves are found throughout your body, from the tips of your toes to the top of your head.



Your nerves take in information from the world. For example, your nerves have helped you collect information about the weight of your backpack when you pick it up and think, “It’s heavy!” Information travels from nerves all over your body to your spinal cord before continuing to your brain. Your brain helps you understand what your nerves have detected. Your brain can then provide directions to other nerves. These other nerves send signals to your muscles that cause you to move.

**Figure 2: Responding to the Environment**

*Signals travel from nerves in your body to your brain. These signals can travel up to several hundred miles per hour!*

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### STOPPING TO THINK 1

- a.** Someone accidentally bumps into you in the hallway. What part of your body detected the feeling of being bumped?
  - b.** Where in your body is this feeling analyzed?
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Sometimes your nervous system responds to messages that you provide. For example, you decide to eat a sandwich. Your brain sends signals along nerves to direct your muscles to pick up the sandwich and take a bite. But what happens after you swallow? Do you have to think about directing your body to process the food? Your body automatically moves food through your digestive system and processes it. For this to happen, muscles inside your body must move. These muscles are controlled by the automatic, or involuntary, part of your nervous system. You don’t even have to think about it!

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### STOPPING TO THINK 2

Is breathing completely involuntary? Explain.

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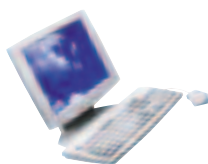


**Figure 3: Touch Receptors on Human Hand**

Why are some parts of your body more sensitive to two points than others? When something touches your arm, you feel it if it is detected by the nerve endings in your skin. You have nerves in your body that detect pressure, heat, sounds, smells, and light. The nerve endings that detect pressure on your skin are called **touch receptors** (ree-SEP-tors). They help carry a message from your skin to your brain.

Some parts of your body have more touch receptors than others. When two points stimulate the same touch receptors, you feel the points as one touch. When they stimulate different touch receptors, you feel two different touches. Figure 3 shows the concentration of touch receptors on a hand. Notice that the tip of the finger has more touch receptors than the rest of the finger. When you reach out to touch something, you often use your fingertips. You may have heard of people with limited or no vision reading Braille. Braille is a written language that uses raised dots instead of letters. Braille is read with fingertips. Not surprisingly, you have the greatest number of touch receptors right at your fingertips—just where they are needed.

## EXTENSION



For links to more information on the human nervous system, go to the SALI page of the SEPUP website.

## ANALYSIS



**1. a.** Where would you expect to have more touch receptors: on the palm of your hand or on the back of your hand? Explain your ideas.

**b.** Explain how you could test your answer to Question 1a.



**2.** Review your results from Activity 5, “Can You Feel the Difference?” Based on what you now know, where on your arm—fingers, palm, or forearm—do you have the fewest touch receptors?